



ADOPTION AND UTILIZATION OF ICT TOOLS IN PUBLIC AND UNIVERSITY LIBRARIES OF BUNDELKHAND: A COMPARATIVE STUDY

¹Nisha Yadav, ² Dr. Dharam Vir Singh

¹Research Scholar, Library & Information Science, Vikrant University, Gwalior (M.P.)

²Professor, School of Library Science, Vikrant University, Gwalior (M.P.)

ABSTRACT

This investigation explores the ways in which the libraries at universities and public libraries in Bundelkhand have integrated and started using information and communication technology (ICT) by utilizing a descriptive research technique. There were ten libraries that were selected to represent a range of different environments, including both metropolitan and semi-urban locations. Of these ten libraries, five were public, and five were university libraries. Librarians, instructors, and students were subjected to a number of different forms of surveys, including both online and offline questionnaires, checklists for observations, and informal interviews. The responses were quantified and analyzed using the Excel program. In order to identify patterns, descriptive statistics were used; in order to search for connections between satisfaction, demographics, and library type, inferential tests were utilized. A better understanding of information and communication technology (ICT) infrastructure, the frequency with which applications are used, user pleasure, and impediments such as poor connections and out-of-date resources was achieved via insights gathered from qualitative interviews and observations, which improved the interpretation. The integrated methodology makes it feasible to conduct a comprehensive assessment of the use of information and communication technology (ICT) in the region's libraries, while also ensuring contextual relevance and validity.

Keywords: *ICT adoption, library services, public libraries, university libraries, Bundelkhand, user satisfaction, digital resources, comparative study, descriptive research, Data analysis*

INTRODUCTION

One of the many ways in which information technology is used is the phrase information communication technology. "Information and Communication Technology" is an umbrella word covering a variety of related fields and tools. In most cases, computers and information technology come together to produce information communication technology. In layman's terms, IT is the framework and collection of interrelated components that make contemporary computing possible. Regardless, the term "information and communication technology" (ICT) does not have a universally accepted definition. All devices—networking components, programs, and systems—that allow one or more entities to interact digitally fall under the umbrella of "information communication technology," a phrase that has gained widespread

acceptance [1]. There was a period when "information technology" and "information communication technology" were interchangeable. While "information technology" encompasses a wide range of topics related to computers and digital media, "information communication technology" encompasses all of these areas and more.

Components of Information Communication Technology

1. Computer Technology
2. Communication Technology
3. Multimedia Technology
4. Transmission Media
5. Optical Technology
6. Storage Technology
7. Barcode Technology
8. Networking Technology

Use of ICT in Libraries

The term "knowledge center" describes academic libraries. Offering a wide range of services to customers is only the beginning; it also helps to safeguard information resources for both current and future users. Now more than ever, libraries are using information and communication technology to enhance their services and conduct other operations, all thanks to the proliferation of these technologies [2]. When it comes to enhancing library services, information and communication technology play a crucial role. One source cites Singh (2015). Libraries have embraced a wide range of ICTs to serve as a central hub where users may access information continuously via their mobile phones, laptops, desktop computers, and other electronic devices. Libraries not only provide a central location from which users can access a wealth of information, but they also run around the clock to ensure that patrons may access their books, databases, and other resources without interruption. The proliferation of both online resources and traditional library cards is a direct result of the explosion of information and communication technology. Not only is the use of information technology enhancing users' learning ability, but it is also saving time for both users and library personnel [3].

Application of ICT in University Libraries of Bundelkhand

Libraries play an essential role in the completion of many tasks related to information and communication technology and their many uses. All academic libraries must embrace information and communication technology for their library functions in order to keep up with the innovation of new applications and features. According to a number of research, libraries are facing urgent requirements to implement application due to changing user tastes and information demands. Both public and private colleges in Bundelkhand are affected by this. Subsequent research confirmed that most libraries in

Bundelkhand are using some sort of information and communication technology to better serve their patrons [4]. Acquisition, circulation, cataloguing, serial control, and other similar tasks are carried out by libraries via application information communication technology. Examining how university libraries make use of ICT; confirming that libraries have proper digital resources and infrastructure [5].

OBJECTIVES

1. To evaluate the state of digital services, software uptake, and ICT infrastructure in Bundelkhand's public and university libraries.
2. To determine the difficulties and impediments that instructors, students, and librarians have while attempting to effectively utilize and integrate ICT into library operations and services.

METHODOLOGY

The diversified population, the absence of infrastructure, and the wide digital gap were all factors that contributed to the selection of the Bundelkhand region. It spans sections of both Uttar Pradesh and Madhya Pradesh and is well-known for its semi-rural and rural characteristics. It is possible that the lessons acquired in this location about the use of information and communication technology (ICT) will be applicable to other socioeconomic environments that are similar [6]. A mixed-method approach is used in this research to capture both the quantitative and qualitative elements of information and communication technology (ICT) usage and the difficulties that arise from its use. In contrast to the majority of previous research, which focused only on urban or technologically advanced surroundings, it utilizes a combination of interviews, questionnaires, and observations made in the field.

Research Design

A descriptive research technique was used to record the trends and the present state of libraries' integration of information and communication technology. In-depth interviews and participant observation were used to provide qualitative insights, while standardized questionnaires that assessed ICT usage, satisfaction, and resource availability were used to collect quantitative data. The data were analyzed using both descriptive. This approach was selected in order to give an assessment that is both ethical and realistic; it was chosen above procedures that are exploratory or experimental. It made it possible to get contextual information without any affecting elements.

Research Sample

The libraries of ten institutions were examined in this study: five university libraries and five public/district libraries. The selected university libraries include Bundelkhand University (Jhansi), Rani Laxmibai Central Agricultural University (Jhansi), Jagadguru Rambhadracharya Divyanga State University (Chitrakoot), Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya (Chitrakoot), and Banda University of Agriculture and Technology (Banda). The public/district libraries covered in the study are Jhansi Public Library, Datia Public Library, Banda Public Library, Chitrakoot Public Library, and Orai Public Library. This selection enables an assessment of the ICT landscape in Bundelkhand across both urban and semi-urban library environments [7]

Research Population

The individuals that participated included students, educators, and library professionals. Librarians reviewed the administration and infrastructure of information and communication technologies (ICT), academics examined the purpose of ICT in the classroom and the academy, and students brought up concerns of frequency, satisfaction, and hurdles to ICT usage.

Data Collection Tools

Data was collected through:

- **Structured Questionnaires:** Separate sets for librarians and users, covering ICT facilities, use patterns, satisfaction, and challenges.
- **Observation Checklist:** To record ICT infrastructure, accessibility, and user interactions.
- **Informal Interviews:** To gather contextual insights into challenges like outdated equipment, poor connectivity, and limited training.

Both online (Google Forms) and offline methods were used, ensuring broader participation.

Data Analysis

The replies were coded using Excel, and SPSS 20.0 was utilized for the purpose of doing the analysis. Mean, median, and standard deviation descriptive statistics exposed trends, while inferential tests examined relationships (for example, satisfaction vs library type, demographics versus information and communication technology usage). In order to improve understanding, qualitative data was combined from interviews and observations [8].

RESULT

Demographic Information

The study examined ten libraries in the Bundelkhand region, comprising five public libraries—Jhansi, Datia, Banda, Chitrakoot, and Orai—and five university libraries, including Bundelkhand University, Rani Lakshmibai Central Agricultural University, Jagadguru Rambhadracharya Divyanka State University, Mahatma Gandhi Chitrakoot Gramodaya Vishwavidyalaya, Banda University of Agriculture and Technology (Banda). Data were collected from students, librarians, and faculty members to ensure representation from both urban and semi-urban context.

Table 1: ICT-Trained Staff and Computer Availability

Library Type	No. of Libraries	ICT-Trained Staff (1–5)	ICT-Trained Staff (6–10)	ICT-Trained Staff (>10)	Computers (<20)	Computers (21–30)	Computers (>30)
Public	5	3	2	0	3	1	1
University	5	3	1	1	1	2	2
Total	10	6	3	1	4	3	3

The number of staff members with training in information and communication technology (ICT) and the number of computers available at universities and public libraries are both shown in Table 1. It is apparent that public and university libraries are understaffed in terms of employing information and communication technology (ICT) properly, since there are only one to five employees who are trained in the field. There is only one university library that has a trained staff of more than 10 individuals, which suggests that only a select few have the financial means that are necessary to embrace information and communication technology (ICT) in its entirety. The fact that a significant proportion of libraries, especially academic libraries, house in excess of thirty computers is an indication that they have better infrastructure [9]. The technological resources seem to be underutilized; however, this might be due to the fact that there is a discrepancy between the number of staff who have received training in information and communication technology (ICT) and the number of computers available.

ICT Trained Professionals

It was determined by researchers that the majority of libraries did not have enough staff members who were knowledgeable in information and communication technology. There was a small fraction of libraries that claimed having 10 or more trained professionals, thirty percent reported having six to ten, and sixty percent reported having less than five. This is an example of how the integration of ICT is being impacted by the absence of skilled LIS professionals [10].

Computerization and ICT Infrastructure

Despite the fact that a number of institutions located in Bundelkhand had already started the process of automation, it was not until the turn of the century that the trend of computerizing libraries really took hold. At terms of the number of computers available to patrons, there was a wide range of availability between libraries. The greatest number of computers, which was 30, was available at the large university libraries; 30 percent of the libraries had 21–30 computers, and 40 percent had less than 20 machines [11]. Despite the fact that every library reported having an internet connection, this was not the case across the board. While the libraries at universities generally had a more powerful local area network (LAN) and wireless fidelity (Wi-Fi), some had less than ten personal computers (PCs) connected.

Internet Facilities

The vast majority of individuals were utilizing one of two different types of internet connections: a local area network, or LAN, or a wireless network, often referred to as Wi-Fi. Regardless, both comments from librarians and evaluations from students pointed out that the connection remained unreliable and the speed continued to be slow.

Automation and Software

Half of the libraries said that they had made the whole transition to digital, while the remaining libraries were either in the midst of making the change or were just beginning to consider it. Libraries reported employing licensed commercial software for library automation in just a few cases; the most common kind of system was an in-house system (40%), followed by open-source tools such as KOHA (30%). Only a tiny proportion of libraries were linked to a wide area network (WAN), which would have enabled customers to use their online public access catalogues (OPACs) from a distant location, despite the fact that 70 percent of libraries possessed OPACs [12].

Table 2: Internet Access and Automation Software

Library Type	LAN (%)	Wi-Fi (%)	OPAC Available (%)	Fully Computerized (%)	Automation Software (In-house / Open Source / Purchased)
Public	60	40	60	40	2 / 2 / 1
University	80	60	80	60	1 / 3 / 1

The proportion of libraries that have access to the internet and make use of automation software is shown in Table 2. University libraries have a more robust digital networking infrastructure than public libraries, as seen by the greater availability of local area networks (LANs) and wireless fidelity (Wi-Fi). The rising use of OPAC (Online Public Access Catalogue) in academic libraries is demonstrative of improved access to library resources for patrons [13, 14]. When it comes to automation software, universities are more likely to adopt open-source solutions, but in-house, acquired, and open-source systems are all used in a variety of combinations. A number of different businesses have seen a modest but notable shift away from manual operations and towards digital operations. Fully computerized libraries are slightly more popular among universities.

Hardware Facilities

There was a diverse range of technical resources available in public libraries. The libraries of universities were the most likely to have access to more current equipment, including scanners, barcode readers, laser printers, servers, backup drives, and multimedia systems. Observations revealed that a significant number of public libraries were lagging behind the times when it came to up-to-date hardware [15].

Library Operations

Technical processing, cataloguing, and acquisitions all made only little use of information and communication technology (ICT). The use of information and communication technology increased in commercial institutions for the purposes of purchases and transactions. Meanwhile, public university libraries made use of these resources more often for copy cataloguing and classification by means of online tools. However, smaller public libraries continued to rely on practices that were performed by hand.

Table 3: Library Operations (Mean Scores, 1–5 Scale)

Operation	Public Libraries	University Libraries
Book Acquisition	3.0	3.7
Ordering / Serial Control	2.5	3.2
Copy Cataloguing	2.5	2.8
Classification	2.3	3.5
User Training	2.5	3.0
Video Conferencing	2.0	2.7
Webinars	1.8	2.5

The mean scores that are shown in Table 3 indicate some of the library's operations, including acquisitions, technological processing, and training for staff members. Scores that were higher in areas such as technical processing, book purchase, and categorization were indicative of activities in university libraries that were more efficient and incorporated information and communication technology [16]. In particular, public libraries did not perform poorly in comparison to other institutions when it came to utilizing webinars and video conferencing for training purposes, nor did they do exceptionally well when it came to the implementation of new information and communication technology (ICT) tools. It seems that university libraries have made more strides in the integration of technology for academic and administrative reasons. That being said, both types of libraries have incorporated information and communication technology into their operations.

Library Services

While university libraries were gradually digitizing circulation services such as membership registration, book reservations, and overdue fee management [17], public libraries offered only a limited number of information and communication technology (ICT) services. Public libraries employed simpler methods of assistance, such as online public access catalogues (OPACs) and manual assistance, whereas university libraries used more sophisticated reference services, such as indexing and bibliographic tools, as well as computer-assisted searching (CAS).

Table 4: Library Services (Mean Scores, 1–5 Scale)

Service Type	Public Libraries	University Libraries
Library Membership	3.5	3.8
Book Reservation	4.0	4.2
Overdue Fines Management	4.0	3.8
Current Awareness Services	2.5	3.0
Digital Books & Reference	3.5	3.8
Institutional Databases	2.0	3.0
Social Media Use	1.5	2.0

Table 4 provides a breakdown of the library's circulation, reference, digital materials, and social media use. The fact that core services like library membership, book reservation, and the management of overdue fines get high marks for both types of libraries indicates that ICT has resulted in improvements to the operational efficiency of libraries [18]. University libraries demonstrate their dedication to research assistance via the provision of more digital resources and by the increased use of institutional databases. There is a significant amount of potential for engagement and outreach that remains untapped in both sectors as a result of the inadequate adoption of social media. Information and communication technology (ICT) has resulted in improvements to service delivery in general, despite the fact that some modern-day instruments have yet to be used.

Digital Content Access

Whereas university libraries were able to access institutional repositories, open access resources, and government-subsidized databases (HEC/UGC) [19], public libraries were mostly able to access digitized books and open internet sources. Both professors and students expressed a great deal of appreciation for the availability of subscription databases and journals, according to the interviews. However, they continued to have difficulties with training and connectivity.

Challenges in ICT Adoption

The following were the main issues mentioned by Bundelkhand libraries:

- Insufficient financing for ICT resources, particularly in public libraries.

- A lack of ongoing training for librarians and a shortage of qualified personnel.
- Limited capacity and poor internet speed that hinder digital access.
- Limited policy support and administrative opposition to ICT implementation.
- Users are not well-informed about sophisticated ICT resources outside of e-books and OPACs.

Despite the fact that university libraries used information and communication technology (ICT) more efficiently [20], public libraries in general were deficient in the consistent finance, competent people, and facilities that were displayed by university libraries.

Table 5: Challenges in ICT Adoption (Mean Scores, 1–5 Scale)

Challenge	Public Libraries	University Libraries
Lack of Funding	3.0	2.2
Lack of Trained Staff	3.5	2.5
Poor Internet Connectivity	3.2	2.1
Lack of Computers	3.4	2.3
Administration Resistance	3.0	1.9
User Awareness	3.0	1.5

The major challenges that libraries face while employing information and communication technologies are described in Table 5. Public libraries are more likely to identify problems such as insufficient funding, workers without training, computers, and internet connection, which indicate that these organizations have more difficulties when it comes to integrating ICT. Despite the fact that there are fewer hurdles to overcome, the libraries at universities continue to be concerned about management's unwillingness to support them and the users' lack of knowledge [21]. It would seem that the staff members at public libraries are not as eager as academic employees to adopt new technologies. In order to effectively incorporate ICT, public libraries need to receive concentrated support in the areas of infrastructure and human resource development, according to these findings.

CONCLUSION

The findings of the study indicate that libraries at universities in Bundelkhand have superior infrastructure, software adoption, and digital services compared to public libraries. Despite the fact that the majority of libraries have begun to computerize and have implemented fundamental automation technologies, there are still a great number of challenges to be addressed. These challenges include the absence of administrative assistance, a dearth of staff members with training in information and

communication technology (ICT), slow internet access, and an inadequate amount of funding. In contrast to public libraries, which rely on fundamental digital tools and online public access catalogues (OPACs), university libraries provide enhanced access to digital items, online databases, and information and communication technology (ICT)-enabled services. To summarize, the results indicate that if public and university libraries in the region want to continue to modernize their services, they must invest additional funds in technology, provide continuous training for their employees, maintain high-speed internet connections, and establish policies that encourage the adoption of information and communication technologies.

REFERENCES

1. Hussain, Akhtar. (2013). The ICT based library and Information services: a case study of B-Schools in Delhi and NCR region. *Library Philosophy and Practice*.
2. Ivwighrehweta, Oghenetega & Ejitaga, Stella. (2022). Undergraduates Digital Literacy Skills And Use Of Electronic Resources In Private Universities In Edo And Delta State, Nigeria By Oghenetega Ivwighrehweta (Cln). *Journal Of Studies In Education*. 15. 68-77.
3. Bar-Hillel, Y. (1955). An examination of information theory. *Philosophy of Science*. 22 (2), 86 -105.
4. Eseho, E. G., Simeon, O. O., and Ehikioya, A. U. (2014). Application of Information and Communication Technology in academic libraries in Nigeria. *International journal of education and research*, 2(12), pp. 423-436
5. Joshi, M. K. (2015). University Libraries in North India: Current Status and Information Technology Use Trends. *DESIDOC Journal of Library & Information Technology*, 35(4), 258- 265.
6. Venkata Ramana, P. and V. Chandrasekhar Rao, "Use of Information Technology in Central University Libraries of India," *DESIDOC Bulletin of Information Technology* 23. 2 (March, 2003): 35.
7. Stonier, T. (1990). *Information and the internal structure of the universe*. New York: Springer Verlag, 282 pp.
8. Peters, J.D. (1988). *Information: Notes toward a critical history*. *Journal of Communication Inquiry*, 12(20), 9-23.
9. Daintith, J. (2009). *The facts on file dictionary of physics*. Infobase Publishing.
10. Singh, A. (2015) ICT and Its Impact on Library and Information Services: A Case Study of Kendriya Vidyalaya Libraries. *International Journal of Science and Research*, 4, 756-770.
11. Spacey, Rachel & Goulding, Anne & Murray, Ian. (2003). ICT and change in UK public libraries: does training matter?. *Library Management*. 24. 61-69. 10.1108/01435120310454520.
12. Islam, S. and Islam, N. (2006) Information Communication Technology (ICT) in Libraries: A New Dimension in Librarianship. *Asian Journal of Information Technology*, 5, 809-817.
13. Lawal, O. O., & Udofia, U. I. (1994). Information needs of rural secondary school adolescents in Nigeria. *Journal of Education and Peace*, 1(1): 1-8.

14. Sathikumar, C. S. (1993). Public Library Development in India. In Raman. Nair, R. (Ed.), Public Library Development. New Delhi: Ess Ess.
15. Dutta, Bimal Kumar (1970). Libraries and librarianship of Ancient and Medieval India. Delhi: Atma Ram
16. Jagdish, M. (1979). Histories of Libraries and Librarianship in Modern India since 1850. Delhi: Atma Ram.
17. Verma, I.N., &Agarawal, U.K. (Eds.) (1994). Public Library Services in India. Udaipur: Himanshu.
18. India. Ministry of Education (1961). Report of Advisory Committee for Libraries. New Delhi: Manager.
19. Bhattacharjee, R. (1999). Role of Raja Rammohan Roy Library Foundation in the promotion of public library movement in India. Herald of Library Science 38 (1-2).
20. Chatoopadhyay, D. P. (1998). Chattopadhyay Committee on NPLIS. CLIS Observer 15(1-2), 12.
21. Sahib, S. (2003). Library and Literacy Movement for National Development. New Delhi: Concept